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ABSTRACT

This guide and the accompanying student workbook, three audio tape cassettes, and script for the audio tape comprise the Adult Basic Education Level I (grade 1.5) package on the metric system. An introductory section to this guide provides (1) an overview of the materials in the package, and also includes a field tested six-step teaching sequence for making effective use of the materials, and a table coordinating the activities in the level I package; (2) background information on adult basic daily living skills; and (3) a discussion of the design and use of the student workbook and the instructor's guide. Four instructional sections (linear measurement, measurement of weight, measurement of capacity, and measurement of temperature) include learning activities relating to daily living skills, lists of materials needed, information on what the teacher needs to know about the metric system, and additional comments corresponding to learning activities and to pages in the student workbook (where applicable). The remaining sections include review material. Appended are sources of material (complete addresses and ERIC document numbers, where possible) on adult education and/or the metric system; script for the level I student posttest booklet; the level I student posttest booklet; and answers to the student posttest. (SH)

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STUDENT POSTTEST BOOKLET

for

METRICS FOR GOOD MEASURE

LEVEL I

CE 011 184

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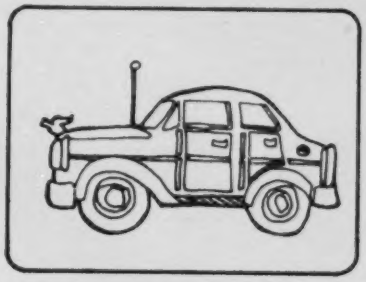

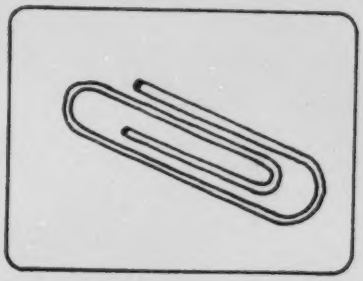

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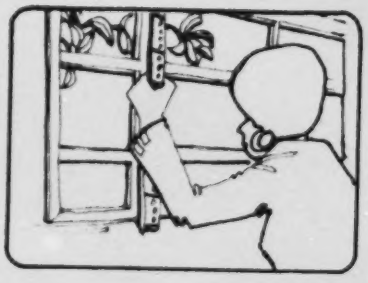

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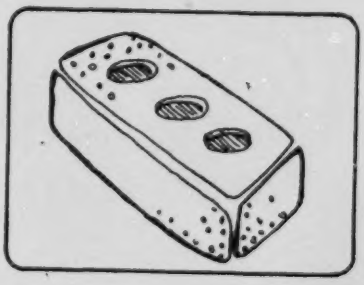

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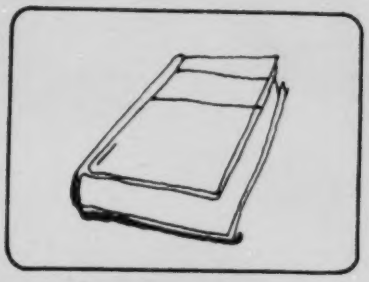

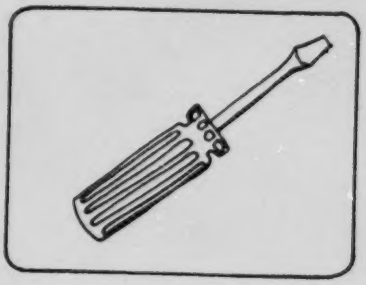

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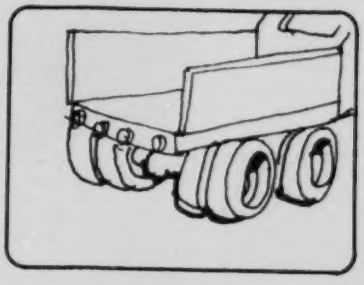

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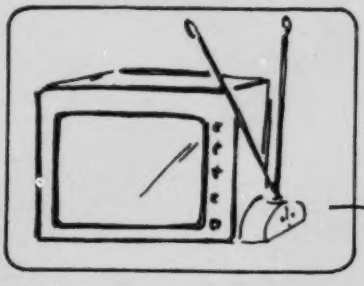

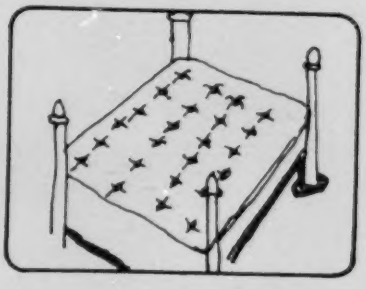

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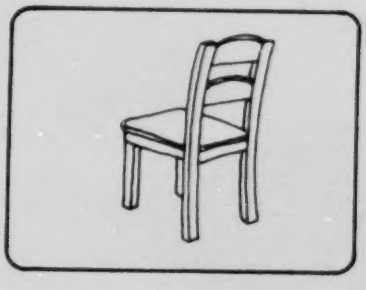

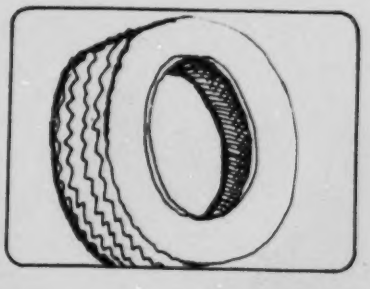

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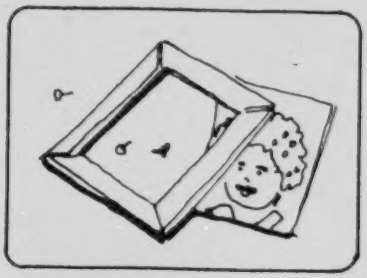

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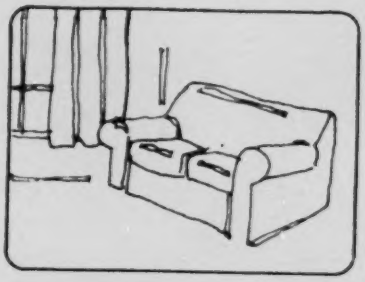

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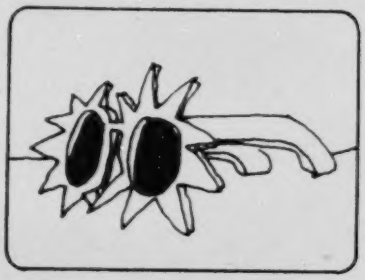

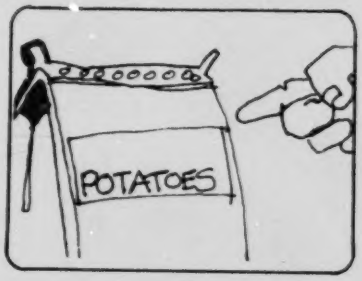

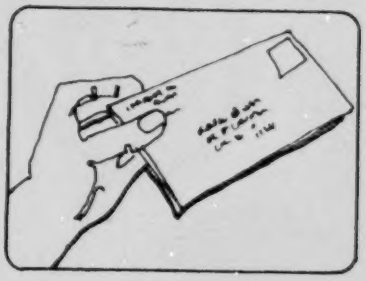

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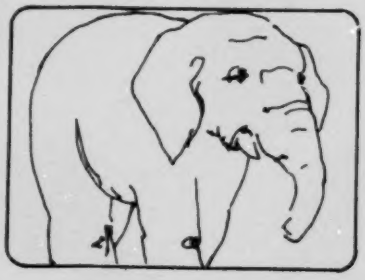

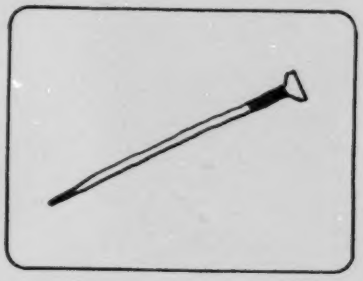

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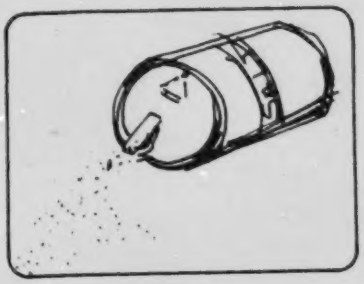


millilitre

13

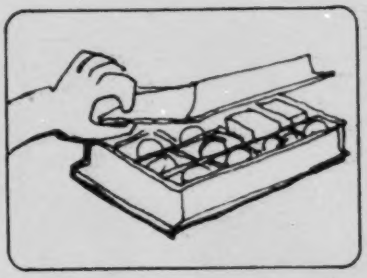
D

kilogram

14

degree Celsius

11



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centimetre

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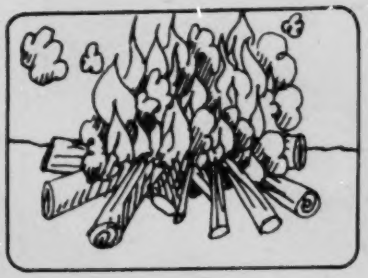

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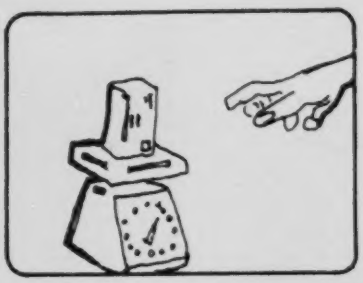
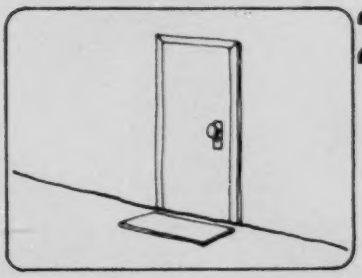
gram

17



metre



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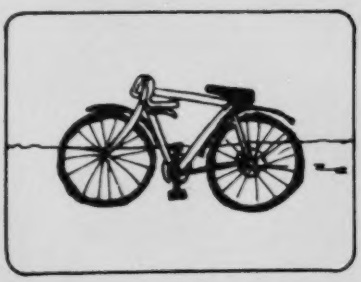
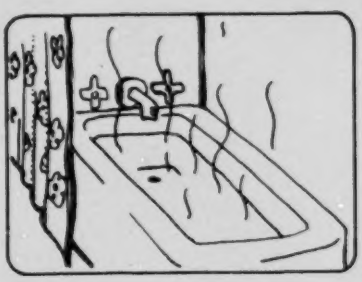
litre

18





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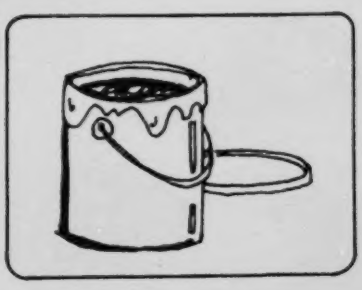
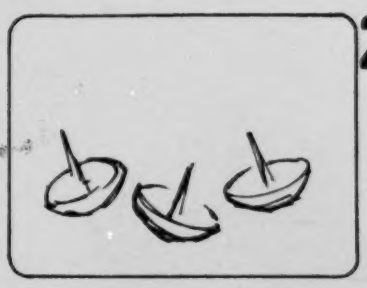
gram

19





22

degree Celsius

E	**gram**	**g**
23	**metre**	**°C**
24	**millilitre**	**ml**
25	**degree Celsius**	**m**
26	**centimetre**	**kg**
27	**kilogram**	**cm**

ANSWERS

to

STUDENT POSTTEST

LEVEL I

1. 1	10. 2	19. litre
2. 3	11. kilogram	20. metre
3. 3	12. degree Celsius	21. degree Celsius
4. 1	13. millilitre	22. gram
5. 2	14. centimetre	23. m
6. 1	15. gram	24. ml
7. 1	16. centimetre	25. °C
8. 3	17. gram	26. cm
9. 2	18. metre	27. kg

Metrics for Good Measure

LEVEL I. INSTRUCTOR'S GUIDE.

Gloria S Cooper
Doris J. Kreitlow
John C. Peterson

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OVERVIEW OF THESE MATERIALS

There are four kinds of materials in the Adult Basic Education LEVEL I package. They are 1) a STUDENT WORKBOOK, consisting of six sections, 2) three audio tape cassettes to be used with the STUDENT WORKBOOK, 3) an INSTRUCTOR'S GUIDE, and 4) a script for the audio tape.

Each audio cassette is taped on both sides. Each side contains one section only. The audio tape script is included so that the instructor has a written copy of what is recorded. If the speech style on the tapes is not appropriate for the students who will be using them, the instructor may choose either to rerecord the script or read the script to the students as they go through the STUDENT WORKBOOK.

Field testing demonstrated that the following teaching sequence makes the most effective use of these materials. Therefore, we strongly recommend that the instructor follows these procedures.

FOR EACH SECTION IN THE STUDENT WORKBOOK

1. Identify new vocabulary before the students begin to listen to the tapes and read the STUDENT WORKBOOK. Page 8 of the INSTRUCTOR'S GUIDE identifies each new word in Section A. and the page in the STUDENT WORKBOOK on which that new word first occurs. Have the students turn to the page in the STUDENT WORKBOOK where a word first appears and let them see it. Then pronounce the word and have the students repeat it after the instructor. The instructor may want the students to circle or underline the new word. The new words for Sections B., D., and E. are on pages 22, 34, and 44, respectively, of the INSTRUCTOR'S GUIDE. There are no new words for Sections C. and E. since they are review sections. Identifying new vocabulary may take from 10 to 20 minutes for each section.

2. Insert the audio cassette in the tape recorder. For example, insert Tape 1, Section A., in the machine. Have the students open their STUDENT WORKBOOKS to page 1. Turn on the tape recorder and have the students follow along in their STUDENT WORKBOOKS as they listen to the tape. When they have finished Section A., have the students close their STUDENT WORKBOOKS. This activity may take from 15 to 25 minutes for each section.

3. Prepare for the Learning Activities by assembling on a resource table materials listed in the INSTRUCTOR'S GUIDE in the part labeled THE TEACHING SEQUENCE CAN BE....

4. Have the students do each Learning Activity. The instructor will have to describe the activity to the students. If some students are reticent about doing the activities, the instructor will find it helpful to become a participant in the activities. Doing the Learning Activities will take from one to two contact hours for each section.

5. Summarize. Complete the lesson by summarizing what the students should have learned. Review the vocabulary list, measurement tools, and measurement units that they learned in the section. Summarizing what the students have learned may take from 10 to 20 minutes for each section.

6. Evaluate. Did the students meet the objectives that were listed in the INSTRUCTOR'S GUIDE for a given section? If not, the instructor should repeat some of the learning activities before proceeding to the next section.

The following table coordinates the materials in the ABE LEVEL I package:

Class Meeting	Audio Tape	Student Workbook Pages	Instructor's Guide Pages	Audio Tape Script Pages
1	A	1 - 16	8 - 21	1 - 9
2	B	17 - 24	22 - 29	10 - 15
3	C	25 - 30	30 - 33	16 - 24
4	D	31 - 42	34 - 43	25 - 31
5	E	43 - 46	44 - 53	32 - 36
6	F	47 - 55	54 - 57	37 - 51

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INTRODUCTION

The ability to use measurement tools and concepts is a basic necessity of adult life. The change to the metric system now taking place in the United States gives the Adult Basic Education student an opportunity to catch up to and even exceed the present measurement skills of the average adult.

Basically, ABE instructors are concerned with providing curriculum materials which have immediate application. ABE students are motivated by learning tasks which improve the quality of their lives now, whether on the job or at home. A chance to learn skills which their neighbors may not have can contribute to self-improvement and self-confidence.

Pragmatic needs and goals have brought these adult students to the ABE program. They can emerge from the unit on metrics with measurement skills they can take home and immediately put to use.

The Adult Performance Level (APL) material here shows some of the everyday skills needed by LEVEL I ABE students.* After the students have finished this unit they should be able to use the metric system in these suggested ways.

*Norvell W. Northcutt. ADULT FUNCTIONAL COMPETENCY: A SUMMARY. Austin, Texas: Adult Performance Level Project Staff, Division of Extension, The University of Texas at Austin. January, 1973.

Consumer Economics	Occupational Knowledge (Including Homemaking)	Health	Community Resources	Government and Law
Increase reading vocabulary to include: length — metre — m width — centimetre — cm height — litre — l scale — degree Celsius — °C mass-weight — gram — g measure — kilogram — kg millilitre — ml		1. Be able to read dosage on a medicine bottle. 2. Read a Celsius thermometer.	Be able to read temperature forecasts in newspaper and on television.	1. Look for price per litre of gasoline posted at gas stations. 2. Read highway signs.
Be able to write the metric symbols m, cm, kg, g, l, ml, and °C.		Be able to record own body measurements in metrics.		
Ask for proper quantities and sizes needed in merchandise.	In service jobs, know and understand metric terms.	Say and understand readings of clinical thermometers, scales, and height measures.	Understand weather forecasts and temperature predictions.	
Be aware of number of servings in commercial metric container sizes.	1. Use millilitre spoons and litre cups in food preparation. 2. Know correct utensil size for quantity prepared.	Relate °C to choice of clothing to wearer.	Keep daily and monthly rainfall records in centimetres.	
When purchasing, know large and small equipment sizes and size of space to be occupied by them.	Know general temperature--low, medium, high--for cooking.	Interpret clinical thermometer readings for person's temperature and take appropriate action.		
Ask for correct sizes in talking to store clerks.	Teach a neighbor to use a metre stick, a metric ruler, and a metric tape measure.	Give the doctor a child's temperature over the phone.	Help others learn the basics of the metric system.	Give accurate estimates of metric measures to law enforcement officials.

DESIGN AND USE OF THE STUDENT WORKBOOK

The STUDENT WORKBOOK has an accompanying cassette tape. Students listen to this tape while they look at the workbook and are helped to read the sentences that belong with each picture. The STUDENT WORKBOOK, the accompanying audio tape, and this INSTRUCTOR'S GUIDE are all organized into six sections:

SECTION	METRIC MEASUREMENT
A.	Linear
B.	Weight
C.	Review of A. and B.
D.	Capacity
E.	Celsius Temperature
F.	Review of A., B., D., and E.

Four of these sections introduce appropriate concepts, measurement words, and measurement devices; the other two sections are review. The students' first task is to recognize and read the new vocabulary items used in single sentences. When the students finish listening to a section, they should go to a resource table which you, the instructor, have organized. At this resource table the students will perform the hands-on activities described in this guide.

The ability to handle number concepts varies widely among ABE students. Therefore, it seemed prudent to plan the LEVEL I STUDENT WORKBOOK for grade 1.5. Instructors may adjust the difficulty upward with numerical examples when they feel it is appropriate for their group. Numbers are used in the STUDENT WORKBOOK to refer to illustrations. Two (2) and five (5) millilitre spoons are designated, and some of the activities include simple recipes.

The STUDENT WORKBOOK and cassette tape use a problem solving approach to introduce metric measurement. Most people have had measurement problems--clothing that does not fit when we get it home, sofas too wide to be moved through doorways, mattresses too long to be moved up stairways. These experiences are often uncomfortable and yet almost everyone has had them.

By utilizing adult experiences, we feel these materials are interesting to the students. We also hope the students intuitively will understand these concepts more readily by stirring the response, "That reminds me of the time that..." or "I see, you have less trouble if you measure it first!"

The role of the teacher is extremely important. Since reading metric information will not provide LEVEL I ABE students with all that they need to know, it is essential that the teacher provide listening, seeing, and doing activities.

Students need to get their hands on measurement tools. As a result of working with the learning activities on the metre and the centimetre, the gram and the kilogram, the litre and the millilitre, and the Celsius thermometer, your students will become familiar with the quantities they represent and will establish their own personal sets of physical references. Thus the students may associate the width of a fingernail with a centimetre and the weight of a brick, a football, or an iron with a kilogram.

Experiences with metrication in other countries such as Australia, England, and Canada show that students learn better when metric units are compared to familiar objects. Students should learn to "think metric." It is difficult and confusing to learn the new system by constantly referring to the Customary system now in use. Even though we will be using Customary and metric measurements side by side for quite a while, students should learn them as separate measurement languages, not by translating from one to the other.

DESIGN AND USE OF THE INSTRUCTOR'S GUIDE

Each of the INSTRUCTOR'S GUIDE Sections A., B., D., and E., is divided into four parts--OBJECTIVES, MATERIALS NEEDED, THE INSTRUCTOR NEEDS TO KNOW..., and THE TEACHING SEQUENCE CAN BE.... Sections C. and F. include only the part THE TEACHING SEQUENCE CAN BE....

The OBJECTIVES part consists of the broad objectives for each section. In addition, other objectives specify the skills the students will acquire as they listen to the audio tape (and read the STUDENT WORKBOOK) or as they work the Learning Activities. This list of objectives should give you a better idea of what you can expect your students to be able to do as a result of completing each section.

The MATERIALS NEEDED part is a list of all materials that will be needed in order to set up the resource table. The materials are used when students work the Learning Activities. A list also is provided with each Learning Activity so that the instructor can see at a glance what is needed for that particular activity.

THE INSTRUCTOR NEEDS TO KNOW... is a brief overview of the metric system. This part contains information beyond that taught in the Section. The relationship to the base unit, symbols for all units, and rules for correct metric notation are all included in this part. Instructors who are fairly familiar with the metric system will find this section helpful for refreshing their knowledge. Instructors who have had less experience with the metric system should find this to be a helpful overview of and possible extension of their knowledge.

THE TEACHING SEQUENCE CAN BE... is meant to be a suggested plan for teaching each section. Here you will find a complete description of each Learning Activity, a list of materials needed for each activity, reference to any pages in the STUDENT WORKBOOK that correspond with the activity, and some comments on how the instructor might proceed to do the activity or some suggestions for extending the activity. The order of the Learning Activities is meant as a suggestion only. If you, the instructor, feel that students will learn better if the Learning Activities are presented in a different sequence, then use your professional judgment to reorder the Learning Activities.

The SCRIPT FOR THE STUDENT POSTTEST BOOKLET and the STUDENT POSTTEST BOOKLET... can be used to evaluate how well your students are able to meet the objectives for these materials. The posttest is not included on the audio tapes so you will have to read the test to the students from the script on pages 65 to 71. Students who do not get at least 22 of the 27 questions correct would probably benefit from repeating the LEVEL I material. The test on pages 73 to 80 can be used as a master for duplicating additional copies. Answers to the test items are on page 80.

A

OBJECTIVE:

For the terms metre and centimetre, the student will recognize and use the appropriate units and symbols. Students will select, use, and read the appropriate linear measuring instrument (metre stick, metric tape measure, or centimetre ruler).

AUDIO TAPE

After completing Section A. the student will be able to. . .

1. Read the words metre and centimetre and the symbols m and cm.
2. Recognize the written words high, height; wide, width; long, short, length.
3. Select a metre stick as the appropriate measuring device when asked to measure large objects.
4. Select a centimetre ruler as the appropriate measuring instrument when asked to measure the linear dimension of small objects.

VOCABULARY

high (p. 1)*	long (p. 4)
metre (p. 1)	short (p. 4)
height (p. 1)	length (p. 5)
wide (p. 3)	centimetre (p. 6)
width (p. 3)	

*STUDENT WORKBOOK page number where word is introduced.

LEARNING ACTIVITIES

1. State or show a physical reference for metre and for centimetre.
2. Estimate the height, width, or length of large objects in metres to within 25% of their actual size.
3. Estimate the height, width, or length of small objects in centimetres to within 25% of their actual size.
4. Read metre sticks, metric tape measures, and centimetre rulers correctly.
5. Measure the linear dimensions of large objects in centimetres to within 10% of their actual size.
6. Measure the linear dimensions of small objects in centimetres to within 10% of their actual size.
7. Write metric quantities using the symbols cm and m.

PARTS:

Part 1. INTRODUCING HEIGHT
Using a Metre Stick to Measure Height
Part 2. INTRODUCING WIDTH
Using a Metre Stick to Measure Width
Part 3. INTRODUCING LENGTH
Using a Metre Stick to Measure Length
Part 4. USING A CENTIMETRE RULER TO MEASURE WIDTH
Part 5. USING A CENTIMETRE RULER TO MEASURE LENGTH
Part 6. CONTRASTING A METRE STICK AND A CENTIMETRE RULER
Introducing the Symbols m and cm

MATERIALS NEEDED NOTES

1. Metre sticks--one for each student.
2. Centimetre rulers--one for each student.
3. Metric tape measures--one for each student.
4. "Models"--a man, a woman, a small child (or large doll).
5. Mak-a-Metre pack (or improvised materials).*
6. "Figure It in Metrics" wall chart, Butterick Publishing Company.*
7. Pencil.
8. Chalkboard eraser.
9. Coffee pot.
10. Book.
11. Audio-cassette tape player.

*See Resources and Materials section on pages 58-61.

THE INSTRUCTOR NEEDS TO KNOW. . .

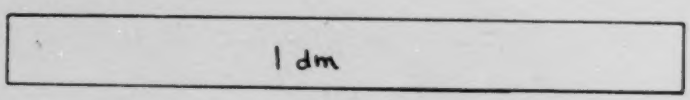
that Section A. is about linear measurement. Linear measure refers to the length, width, or height of an object. Students will be asked to estimate and measure the length, width, or height of various objects.

The base unit of linear measure in the SI, or metric system, is the metre. (SI is an abbreviation for Système International d'Unités or International System of Units.) The basic tool for measuring metres is the metre stick. The symbol m is used to denote metre or metres. Notice that no period is placed after the m unless it is at the end of a sentence.

- If you place one end of a metre stick on the floor and hold the stick against your leg you will find that the other end of the metre stick is near your waist. You may want to take a metre stick and do Learning Activities 1 and 2. These two learning activities are designed to give you and your students a feeling for the length of a metre and a metre stick.

Because a metre is too long to measure many things it has been divided into smaller units. All of these units have the word metre in them. A different prefix is used to differentiate between these subunits. The three most commonly used subunits all have prefixes that end in the letter i.

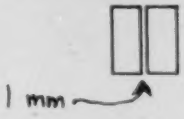
The first subunit is a decimetre. It is one tenth of a metre. The rectangle below is one decimetre long. There are 10 decimetres in one metre. The decimetre is a unit that is seldom used; but you, the instructor, should be aware of this unit so that you will have a better understanding of the metric system. The symbol for decimetre is dm.



If a decimetre is divided into 10 equal subunits, each of these subunits is called a centimetre. There are 10 centimetres in a decimetre or 100 centimetres in a metre. The centimetre and the metre are the only linear units that are used in the LEVEL I materials. At the right is a rectangle that is one centimetre long. Remember that since there are 100 centimetres in one metre, each centimetre is one hundredth of a metre. Most centimetre rulers are 20 or 30 centimetres long. The symbol cm is used for centimetre.

- Measure the width of a paper clip and a penny. A paper clip is about one centimetre wide and a penny is about two centimetres wide. You might want to work through Learning Activity 5 so that you get a better understanding of the length of a centimetre.

If a centimetre is divided into 10 equal parts, each part is called a millimetre. There are 10 millimetres in a centimetre and 1 000 millimetres in a metre. At the right there are two small rectangles. The distance between these rectangles is one millimetre. The symbol mm is used to represent millimetres.



- Many students are used to millimetres because they smoke cigarettes that are 100 mm or 120 mm long. Note that a 100 mm cigarette is also 10 cm or 1 dm long. A dime is about one millimetre thick.

There are times when it is not convenient to refer to large linear measures in metres. When this happens large units are used. The names of these larger units all have the word metre plus some prefix. For the larger units the prefixes do not end in the letter i.

The first of these larger units is 10 metres long. It is called a dekametre and the symbol dam is used. Ten dekametres is a hectometre (hm). There are 100 metres in one hectometre. Ten hectometres is a kilometre (km). There are 1 000 metres in one kilometre. Dekametres, hectometres, and kilometres are not used in the LEVEL I materials. In fact, dekametres and hectometres will seldom be used. Kilometres are used to designate distances such as the distance between two cities. Many signs on the interstate highways now give the distance to major cities in kilometres.

The table below shows the relationship between the base unit (metre) and the other linear units.

Unit	Symbol	Value in Metres	Read as
kilometre*	km	1 000 metres	one thousand metres
hectometre	hm	100 metres	one hundred metres
dekametre	dam	10 metres	ten metres
metre* (base unit)	m	1 metre	one metre
decimetre	dm	0.1 metre	one tenth of a metre
centimetre*	cm	0.01 metre	one hundredth of a metre
millimetre*	mm	0.001 metre	one thousandth of a metre

*Units commonly used.

THE INSTRUCTOR NEEDS TO KNOW ... (CONT.)

METRIC NOTATION

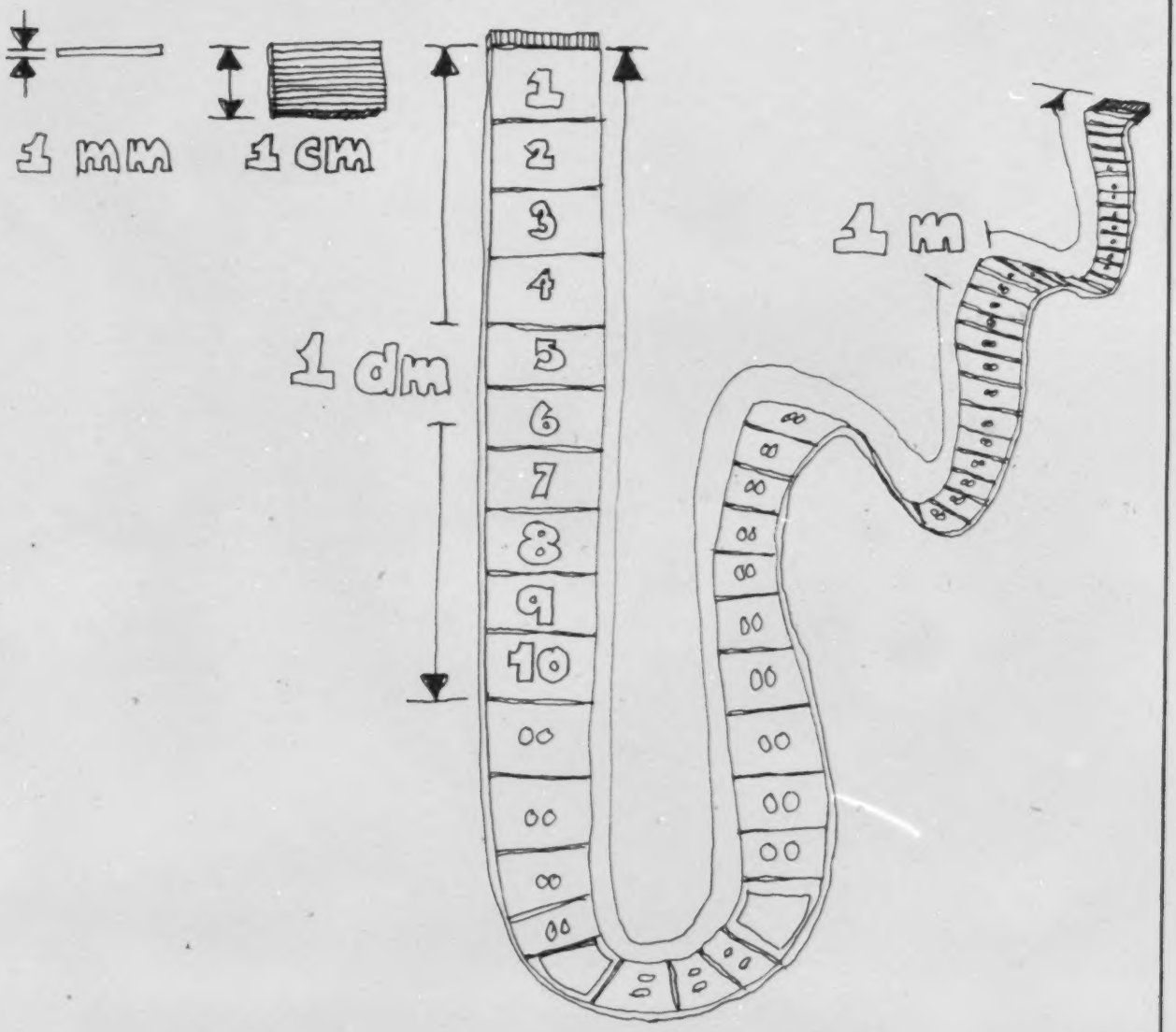
In writing lengths in metric notation there are a few rules that should be followed. To express a length such as 15 metres you write 15 m. Notice that there is a space between the numeral 15 and the symbol m. Remember that no period is placed after the symbol unless it is at the end of a sentence.

Numbers that are one thousand and larger use a space instead of a comma to separate groups of three digits. Thus, a quantity such as 25,683,927 centimetres should be written 25 683 927 cm.

When referring to quantities less than one unit in length, a zero (0) is placed to the left of the decimal point. Thus, 0.25 cm would be used rather than .25 cm. This is not necessary when there is a combination of whole units and partial units. For example, 2.35 dm is correct; 02.35 is not.

The last rule is that two different units are never mixed. It is not correct to write 6 m and 7 cm. Instead this should be expressed entirely in metres, entirely in centimetres , or entirely in some other linear unit. Since there are 100 cm in 1 m, there are 600 cm in 6 m and hence this length of 6 m and 7 cm could be expressed as 607 cm. If you want to express this in metres rather than in centimetres you must remember that 1 cm is the same as 0.01 m (1 centimetre is the same as one hundredth of a metre). So, 7 cm is 0.07 m and 6 m and 7 cm would be written 6.07 m.

The LEVEL I materials make no attempt to teach students how to convert from metres to centimetres or from centimetres to metres. You should not attempt to teach the students these conversions. When their reading and mathematics skills improve to LEVEL II and LEVEL III they will study these conversions. Do not correct a student who writes or says 6 m 7 cm. While this notation is not technically correct, it does enable the student to communicate with other people.


1 mm
1 cm
1 dm
1 m
1
2
3
4
5
6
7
8
9
10

THE TEACHING SEQUENCE CAN BE. . .

ACTIVITY	MATERIALS NEEDED
Student Workbook, Section A. Audio Tape, Section A.	Audio-cassette tape player.

Learning Activity 1: A METRE HIGH

Have each student pick up a metre stick. Stand the stick up on the floor, holding it in place with a hand. Walk around the stick. Stand close to it and with the other hand touch the part of the body which matches the top of the metre stick. Emphasize "This is how high a metre is."

Metre stick for each student.

Learning Activity 2: A METRE WIDE

Have each student hold an arm outstretched and extend the metre stick along the length of the arm at shoulder height. Determine at what part of the torso the metre stick ends. Emphasize "This is how wide a metre is."

Metre stick for each student.

Learning Activity 3: MEASURING METRES

Have the students take their metre sticks and measure objects around the room. Ask the students students if the length of the object is the same as, longer than, or shorter than a metre. Measure such things as the height of a doorknob from the floor, each other's height, the length of a table, the length of a wall, and so on.

Metre stick for each student.

STUDENT WORKBOOK PAGES	COMMENT
1-8	Students should listen to the tape while looking at the STUDENT WORKBOOK. As they are instructed on the tape, the students should try to read the sentences under each picture. They should feel free to replay any portion of the tape. Students are introduced to recognizing and reading the words metre and centimetre and the symbols m and cm.

After the students have completed Section A, pages 1-8,have them go to the resource table and lead them through Learning Activities 1, 2, and 3. In these three Learning Activities students will USE metre sticks and should get a feeling for the length of a metre or metre stick. Give each student enough time to fully understand the concept of metric length.

ACTIVITY	MATERIALS NEEDED
Learning Activity 4: GUESSTIMATING	
Now guesstimate in metres the height of a door, the width of a window, the width of a table, and the height of a chair. Use Exercise A.1. Have students write their guesstimates in the space after the question mark. (Do not use centimetres at this point, just rough estimates in metres.)	
Learning Activity 5: SIZE OF CENTIMETRE	
Introduce the centimetre ruler. Compare the ruler with the metre stick and show the centimetre divisions on both the stick and the ruler. Have the students hold centimetre rulers against the width of their index fingernails noting that this is approximately 1 centimetre. Have the students hold rulers against their thumbs from the first joint to the end of the thumb; this length should be about 3 centimetres. The length of the palm of an average hand is about 10 centimetres.	Centimetre ruler for each student.
Learning Activity 6: GUESSTIMATING AND MEASURING	
Have the students help you set up a resource table. Spread the following objects on the table: a pencil, a chalkboard eraser, a coffee pot, and a book. First, have the students guess the sizes of the objects in centimetres. Use Exercise A.2. Guesstimates are placed in the space after the question mark. Then confirm the sizes with centimetre rulers. Students should write the correct symbol after each guesstimate and after each actual measurement.	Centimetre ruler for each student. Pencil. Chalkboard eraser. Coffee pot. Book.

STUDENT WORKBOOK PAGES	COMMENT
9	Now that the students are comfortable with the concept of metre, have each student start guessing the height or width of the objects in Learning Activity 4. DO NOT measure the objects--just GUESS! Stress approximation. It is excellent if students are within 25% of the correct measure. Turn over the sheet used for Exercise A.1. for more room to guesstimate using other objects around the room. At this point accept answers such as "almost two metres," "less than three metres," "two and a half metres," etc.
	This Learning Activity introduces the students to the centimetre by means of hands-on activities. In this Learning Activity students will USE the centimetre ruler and should get an internal feeling about the length of a centimetre and how to use the centimetre ruler. Give each student enough time to fully understand the concept of centimetre.
11	Now that students are comfortable with the concept of centimetre and with using the centimetre ruler, have each student start guessing the measures (in centimetres) of each of the objects in Learning Activity 6. DO NOT measure each object--just GUESS! Guesses should be recorded in the space beside the question mark on Exercise A.2. After they have guessed the measures, have each student measure the object and record the answer on the appropriate line in Exercise A.2. Use the other side of the Exercise page for further practice.

ACTIVITY	MATERIALS NEEDED
Learning Activity 7: MAKING A METRE STICK	
Have each student make a metre stick by using prepackaged or improvised materials. Divide the length of the stick into 10 equal parts. Label these 1 through 10. These divisions are called decimetres but avoid using the term decimetre with the students. Each decimetre is then divided into 10 equal parts. These divisions are called centimetres.	Prepackaged or improvised metre stick materials for each student. See Materials and Resources on pages 58-61.
Learning Activity 8: METRIC TAPE MEASURE	
Introduce the metric tape measure. Find out body measurements of each student. Each student can measure his or her body including chest, waist, and hip measurements. Compare these measurements with the Butterick Pattern Measurement Chart. What size pattern would each student buy?	Metric tape measure for each student. "Figure It in Metrics" wall chart.
Learning Activity 9: TAKE HOME PRACTICE	
Suggest activities such as those pictured in Exercise A.3. that can be done at home with the metre stick each student has made. Have the students guesstimate and then measure their own or a neighbor's refrigerator, sofa, car, and windows. Students should write the correct symbol after each guesstimate and actual measurement.	Students' metre sticks from Learning Activity 7.

STUDENT WORKBOOK PAGES	COMMENT
	Learning Activity 7 reinforces what the students have been doing by having them build their own metre sticks. This not only helps students further understand the metre but shows them the relationship between a metre and a centimetre. Students should retain their metre stick so they can use it in Learning Activity 9.
	This activity helps students to relate further the metre to their body measurements. It introduces a new measuring tool--the metric tape measure. Before you begin this activity you might want to have students compare the length of their tape measure with the length of a metre stick. Note that many metric tape measures are 150 cm or 1.5 m long.
13	Give the students Exercise A.3. to take home. Again ask them to first guess the indicated measures of each of the objects pictured in the Exercise. After they have guessed the measure, they should use the metre sticks they made in Learning Activity 7 to find the actual measurement. At this point you can accept answers such as 3 m 5 cm. In fact, you should encourage this kind of answer as a first step in learning the metric system. And you can encourage the student to use the back of the Exercise page for further practice.

ACTIVITY	MATERIALS NEEDED
Learning Activity 10: BODY MEASUREMENT (Optional)	
Have three volunteer "models" available in the classroom: a man, a woman, and a small child (or use a large doll). Provide students with metric tape measures and have them fill in the "Body Measurements" chart in Exercise A.4. Have the students write the correct symbol after each measurement.	Metric tape measure for each student

STUDENT WORKBOOK PAGES	COMMENT
15	Here again the students get a chance to relate the metre to body measurements. As they work through this Learning Activity, students should be encouraged to compare their body measurements from Learning Activity 8 to the measurements of the three "models" in this activity. Again, use the back of the Exercise page for further practice.

B

OBJECTIVE:

For the terms gram and kilogram, the student will recognize and use the appropriate measurement units and symbols. Students will select, use, and read the appropriate measuring instrument (gram scale or kilogram scale).

AUDIO TAPE

After completing Section B. the student will be able to. . .

1. Read the words kilogram and gram and the symbols kg and g.
2. Recognize the written words weight, weigh, scale, measure, light, heavy, large, small, kilogram scale, and gram scale.
3. Select a kilogram scale as the appropriate measuring instrument when asked to weigh heavy objects.
4. Select a gram scale as the appropriate measuring instrument when asked to weigh light objects.

LEARNING ACTIVITIES

1. Estimate the weight of heavy objects (25 kg or less) in kilograms to within 25% of their actual weight.
2. Estimate the weight of light objects in grams to within 25% of their actual weight.
3. Read a kilogram scale and a gram scale correctly.
4. Measure the weight of heavy objects in kilograms to within 10% of their actual weight.
5. Measure the weight of light objects in grams to within 10% of their actual weight.
6. Write kilogram quantities using the symbol kg and gram quantities using the symbol g.

VOCABULARY

measure (p. 17)*	weigh (p. 19)
large (p. 17)	kilogram scale (p. 20)
small (p. 17)	kilogram (p. 20)
scale (p. 18)	gram scale (p. 20)
weight (p. 18)	gram (p. 20)

*STUDENT WORKBOOK page number where word is introduced.

PARTS:

Part 1. INTRODUCING THE WORD MEASURE
Part 2. INTRODUCING WEIGHT
Using Scales
Part 3. INTRODUCING GRAMS AND KILOGRAMS
Introducing the Symbols g and kg

MATERIALS NEEDED NOTES

1. Metric kilogram scale.
2. Gram scale and weights or improvised substitutes.*
3. Cube-o-gram set.*
4. Sugar cube.
5. Nickel.
6. Paper clip.
7. Pencil eraser.
8. Pencil.
9. Sunglasses.
10. Centimetre ruler.
11. Brick.
12. Apple.
13. Package of rice.
14. Large package wrapped for mailing--over 3 kg.
15. Set of weights--1 g, 3 g, 5 g, 20 g, 50 g, 100 g, 500 g, 1 kg.
16. Audio-cassette tape player.

*See Resources and Materials section on pages 58-61.

THE INSTRUCTOR NEEDS TO KNOW. . .

that Section B. is about measuring weight or mass. The mass of an object refers to a measure of the amount of matter contained in the object. This amount always remains constant so long as something is not added to or subtracted from the object. Weight is the term that most people use when they mean mass. Weight, however, is affected by gravity while mass is not. Thus, the weight of an object on the moon is one sixth its weight on earth. The mass of that same object is the same whether the object is on the moon or on the earth. The word weight is used in the LEVEL I materials because this is the word that is more familiar to the students.

The basic SI unit of mass is the kilogram and the symbol kg is used to designate kilogram or kilograms. A kilogram scale will be used to measure kilograms. Kilogram scales come in many shapes and sizes. A bathroom scale and a scale in a doctor's office are two different types of kilogram scales.

- Weigh yourself on a kilogram scale. Weigh other heavy objects such as a sack of potatoes, a bag of sugar, and a pet. Work through Learning Activities 1, 4, and 5. Guesstimate the weight of a friend and various objects before you weigh them. Keep trying until you are able to make fairly accurate guesses.

A kilogram is a rather heavy unit. Because of this it is often necessary to use subunits for expressing light objects. The most common subunit is the gram. There are one thousand grams in one kilogram. Thus, each gram represents one thousandth of a kilogram. The symbol g is used to represent grams. The units dekagram and hectogram are very seldom used. There are 10 hectograms in one kilogram and 100 dekagrams in one kilogram.

There is one unit larger than a kilogram that is often used. The metric ton is 1 000 kilograms. The metric ton is used for shipping corn, wheat, and other large quantities. The symbol t is used to represent the metric ton. This unit has been spelled tonne but because of possible confusion with the ton (2000 pounds) the term metric ton has been adopted.

- Pick up a raisin. Feel how light it is! It weighs about one gram. Pick up a nickel. A nickel weighs about 5 g. You might want to work through Learning Activities 2 and 3 so that you get a better understanding of the weight of a gram.

METRIC NOTATION

In writing weights in metric notation there are a few rules that should be followed. To express a weight such as 37 grams you write 37 g. Notice that there is a space between the numeral 37 and the symbol g. Remember that no period is placed after the symbol unless it is at the end of a sentence.

Numbers that are one thousand or larger use a space instead of a comma to separate groups of three digits. Thus, a quantity such as 45,892 kilograms should be written 45 892 kg.

When referring to quantities less than one unit in weight, a zero (0) is placed to the left of the decimal point. Thus, 0.84 kg would be used rather than .84 kg.

The last rule is that two different units are never mixed. It is not correct to write 45 kg 9 g. Instead this should be expressed entirely in kilograms, entirely in grams, or entirely in some other unit of mass. Since there are 1 000 grams in one kilogram, 45 kg is equal to 45 000 g and so the proper way to express 45 kg 9 g in kilograms is 45 009 g. If you want to express this same quantity in kilograms then you would have to change 9 grams to kilograms. Since one gram is .001 kilograms, 9 g equals 0.009 kg, and thus 45 kg 9 g would be written 45.009 kg.

The LEVEL I materials make no attempt to teach students how to convert from grams to kilograms or from kilograms to grams. You should not attempt to teach the students these conversions. When their reading and mathematics skills improve to LEVEL II and LEVEL III they will study these conversions. Do not correct a student who writes or says 45 kg 9 g. While this notation is not technically correct it does enable the student to communicate with other people.

THE TEACHING SEQUENCE CAN BE. . .

ACTIVITY	MATERIALS NEEDED
Student Workbook, Section B. Audio Tape, Section B.	Audio-cassette tape player.
Learning Activity 1: WEIGH YOURSELF	
Demonstrate the use of a metric bathroom scale and have students weigh themselves.	Metric bathroom scale.
Learning Activity 2: GRAMS, GRAMS, GRAMS	
Have students develop a feeling for the weight (mass) of 1 gram, 3 grams, 5 grams, and 20 grams by holding in their hands measures representing these masses. Now have students pair up. One member of the pair should close his/her eyes while the other puts one of the gram weights in the other's hands. The person with eyes closed should try to guess the weight (mass) of the object. After several turns the partners reverse roles.	Set of weights (mass pieces)-- 1 g, 3 g, 5 g, and 20 g.
Learning Activity 3: GUESSING AND WEIGHING	
Have the students help you set up a resource table. Spread the following objects on the table: paper clip, nickel, sugar cube, pencil, eraser, sunglasses, and centimetre ruler. First have the students guesstimate the weight of each object in grams. Use Exercise B.1. As usual, guesstimates are placed in the space after the question mark. After everyone has recorded his guesstimates then students should find the actual weight of each object using the gram scale. Praise students whose guesstimates are close to the actual weights. Have students write the correct symbol after each guesstimate and measurement.	Gram scale and set of weights. Paper clip. Nickel. Sugar Cube. Pencil eraser. Pencil. Sunglasses. Centimetre ruler.

STUDENT WORKBOOK PAGES	COMMENT
13-16	Students should listen to the tape while looking at the STUDENT WORKBOOK. As they are instructed on the tape, students should try to read the sentences with each picture. They should feel free to replay any portion of the tape they did not fully understand. Students are introduced to recognizing and reading the terms gram and kilogram and the symbols g and kg.
	This is a fun activity. Everyone will be surprised at how "little" they weigh in kilograms. You might want to place the scale in a corner of the room so that students who want to keep their metric weight secret can do so.
	This activity gives students an opportunity to develop a feeling for the weight of a gram. Most students will find it difficult to differentiate between the weight of some of these pieces. Trying to guess the weight of a piece while blindfolded should, after several trials, enable students to improve their ability to distinguish the weight of a piece.
17	Now that students are beginning to feel comfortable with the concept of gram, have each student guess the weight of the light objects that have been placed on the table. DO NOT weigh the objects--just GUESS! After they have guessed the measures have each student weigh the object and record the answer in the appropriate spot on Exercise B.1. It is excellent if students are within 25% of the correct weight. Use the other side of the Exercise page for further practice.

ACTIVITY	MATERIALS NEEDED
Learning Activity 4: KILOGRAMS AND MORE GRAMS	
Have students develop a feeling for the weight of 50 grams, 100 grams, 500 grams, and 1 kilogram by holding in their hands objects representing the masses.	Set of weights (mass pieces)-- 50 g, 100 g, 500 g, and 1 kg.
Learning Activity 5: WHAT'S IT WEIGH?	
Have the students help you set up a resource table of heavier objects. Among the objects you place on the table include a brick, an apple, a package of rice, and a large package wrapped for mailing (weighing over 3 kilograms). First have the students guesstimate the weight of each object in grams or kilograms. Use Exercise B.2. After students have recorded their guesstimates in the space after the question mark they should find the actual weight of each object using the scales. Students should record the actual weights using the correct symbols.	Gram scale and set of gram weights. Kilogram scale. Brick. Apple. Package of rice. Large package wrapped for mailing-- package should weigh over 3 kg.
Learning Activity 6: WHAT WE EAT	
Ask students to examine boxes, cans, and sacks of prepackaged food to see what each one weighs. They can either go to a grocery store or their cupboard. You might suggest such things as soup, sugar, flour, and so forth.	

STUDENT WORKBOOK PAGES	COMMENT
	As in Learning Activity 2, students are to get a feeling for how much these objects weigh. Again, let them lift the weights so that they can see how much each weighs. Let students see how well they can guess the weight of an object when they are blindfolded or cannot see the object. Try combinations of weights. For example, put the 50 g and the 100 g weight in someone's hand. What does this combination weigh?
18	Students should have a good understanding for the "feel" of grams and a kilogram. Now let them try out their feelings on these objects. As usual, first let them guess the weight of each object. Make sure they use the correct symbol to record their guesses. After they have guessed the weight they should determine the actual weight of each object and record the answer in the appropriate spot on Exercise B.2. Praise students who are able to guess within 25% of the actual weight. Turn over the sheet used for Exercise B.2. for further practice.
	This is a do-at-home activity. Ask students to examine various containers to see how much the contents weigh. Soup, sugar, flour, rice, and many other products have their metric weights printed on the label. You should point out that most labels give net weight or the weight of the contents and not the weight of the contents and the package. You may want to ask some students to bring in examples that they found. Empty some of the containers and have students weigh the contents. Do they get the same figure that is on the label?

THE TEACHING SEQUENCE CAN BE. . .

ACTIVITY	MATERIALS NEEDED
Student Workbook, Section C. Audio Tape, Section C.	Audio-cassette tape player.

Part 1. REVIEWING LINEAR MEASUREMENT

Part 2. REVIEWING MEASUREMENT OF WEIGHT

Part 3. LINEAR AND WEIGHT MEASUREMENT TOOLS

Exercise C.1.

STUDENT WORKBOOK PAGES	COMMENT
25-26	Students should listen to the tape while looking at the STUDENT WORKBOOK. As they are instructed on the tapes, the students should try to read the sentences with each picture. They should feel free to replay any portion of the tape. Students are introduced to recognizing and reading the word measure. This section reviews the terms and symbols that were introduced in Section A. and Section B. The last three parts of Section C. give students an opportunity to practice what they have learned in Sections A. and B. After Exercise C.1., Exercise C.2., and Exercise C.3. the tape player should be stopped so that students have enough time to complete each Exercise. After the students have completed each Exercise the tape player should be restarted. When the player is restarted the students will hear the answer to the Exercise they just completed, and then they will hear the next Exercise. This gives students a chance to correct any misunderstandings they have before they begin the next Exercise. These Exercises are for diagnostic and self-correcting purposes and the students should be able to use them as guidelines to their progress. Do not be alarmed if students miss an occasional question. Review procedures are suggested for students who miss two or more questions on any one Exercise.
27	This set of questions in Exercise C.1. is to give students, and their instructor, an opportunity to assess how well students can select the appropriate linear and weight measurement tools. If a student does not do well then it might be a good idea to consider reviewing (or repeating) Section A. or Section B.

ACTIVITY	MATERIALS NEEDED
Part 4. PRACTICING USE OF LINEAR AND WEIGHT MEASUREMENT TASKS Exercise C.2.	
Part 5. PRACTICING THE USE OF LINEAR AND WEIGHT TERMS AND SYMBOLS Exercise C.3.	

STUDENT WORKBOOK PAGES	COMMENT
28	The questions in Exercise C.2. give students an opportunity to determine how well they can select the appropriate measurement unit for an object and then recognize that measurement word. If students do not do well on this Exercise but they did well in Exercise C.1., the instructor needs to help strengthen their vocabulary. If students do not do well on C.1. and C.2., they should consider reviewing Sections A. and B.
29	In Exercise C.3. the students are to match measurement terms with the symbols for these terms. This will provide a measure of how well students can recognize these words and symbols. Students who do not do well should review the vocabulary words and symbols for Sections A. and B.

D

OBJECTIVE:

For the terms litre and millilitre, the student will recognize and use the appropriate measurement units and symbols. Students will select, use, and read the appropriate measuring instrument for capacity (millilitre spoons or litre cup).

AUDIO TAPE

After completing Section D. the student will be able to. . .

1. Read the words millilitre and litre and the symbols ml and l.
2. Recognize the written words liquid, litre cup, 2 millilitre spoon, and 5 millilitre spoon.
3. Select a litre cup as the appropriate measuring instrument when asked to find the capacity of large containers or amounts.
4. Select a set of millilitre spoons as the appropriate instruments when asked to find the capacity of small amounts.

LEARNING ACTIVITIES

1. Estimate the capacity of containers in litres to within 25% of the actual capacity.
2. Read the measurements on a litre cup and millilitre spoons correctly.
3. Measure the capacity of containers in litres to within 10% of the actual capacity.
4. Measure the correct amount in litres or millilitres needed for a recipe.
5. Write litre quantities using the symbol l and millilitre quantities using the symbol ml.

VOCABULARY

litre cup (p. 32)*
litre (p. 33)
liquid (p. 33)
2 millilitre spoon (p. 34)
5 millilitre spoon (p. 35)
millilitre (p. 36)

*STUDENT WORKBOOK page number where word is introduced.

PARTS:

Part 1. INTRODUCING LITRE
Part 2. INTRODUCING MILLILITRE
Using Metric Measuring Spoons
Part 3. REVIEW OF LITRE AND MILLILITRE
Introducing the Symbols l and ml

MATERIALS NEEDED

1. One-litre freezer container.
2. Graduated containers marked in litres and 500 millilitres.
3. Set of millilitre spoons--1, 2, 5, and 15 millilitres.
4. Large pitcher of water.
5. Large pail or bucket.
6. Variety of containers such as:
   - juice glasses
   - paper or plastic coffee cups
   - sauce pans
   - casserole dish
   - gelatin mold
   - soft drink container
   - frying pan
7. Medicine prescription bottles with dosages in millilitres.
8. Electric 36 cup coffee pot.
9. Coffee cups--one for each student.
10. Coffee.
11. Rice.
12. Waterproof marking crayons.
13. Empty fruit and vegetable cans and other containers for food that we ordinarily buy at grocery stores.
14. Sugar.
15. Cream or cream substitute.
16. Food coloring.
17. Confectioners' sugar.
18. Food items for recipes on STUDENT WORKBOOK pages 39-42--have enough to serve the entire class.
19. Forks, mixing spoons, mixing bowls, cutting board, paring knife.
20. Audio-cassette tape player.

NOTES

THE INSTRUCTOR NEEDS TO KNOW. . .

that Section D. is about measurement of capacity. Capacity refers to the amount of space enclosed by an object or container. The term capacity is used to refer to either volume or capacity. Students will be asked to estimate and measure the capacity of several containers and will use measures of capacity in preparing recipes.

The basic unit of capacity in the SI, or metric system, is the litre. A cube or box that is one decimetre long, one decimetre wide, and one decimetre high has a capacity of one cubic decimetre, or one litre. The symbol for a cubic decimetre is dm^3. The symbol for litre is l. Notice that this symbol is not the numeral one but a small, or lower case, letter L. Because there can be some confusion when the last digit of a number is one, it is very important that a space be left between a numeral and the symbol for litre.

- The litre will be a very common household unit. Milk, motor oil, gasoline, bleach, and soda pop are a few of the products that will be purchased in litres. You might want to do Learning Activities 2 and 3. These two learning activities are designed to give students a feeling for a litre.

The cubic decimetre, or litre, is often too large a unit for many uses. When this happens the smaller unit that is used is the millilitre. There are one thousand millilitres in one litre. The symbol for millilitre is ml. Millilitre is another name for cubic centimetre. A box that is one centimetre long, one centimetre wide, one centimetre high is a cubic centimetre. The symbol for cubic centimetre is cm^3. There are 1 000 cubic centimetres in one cubic decimetre.
decimetre.

- A teaspoon holds five millilitres. Learning Activity 1 gives people experience with millilitre spoons that will be used in cooking. Learning Activity 7 is designed to give experience using millilitre spoons and litre measuring cups. You might want to try these recipes at home so that you are sure that you understand all of the steps.

Since a litre is the basic unit of measure for capacity, smaller or larger units are often needed. When this is the case these new units have names with the word litre plus some prefix. The table below shows the relationship between the base unit (litre) and the other units of capacity.

Unit	Symbol	Value in Litres	Read as
kilolitre	kl	1 000 litres	one thousand litres
hectolitre	hl	100 litres	one hundred litres
dekalitre	dal	10 litres	ten litres
litre*(base unit)	l	1 litre	one litre
decilitre	dl	0.1 litre	one tenth of a litre
centilitre	cl	0.01 litre	one hundredth of a litre
millilitre*	ml	0.001 litre	one thousandth of a litre

*Units commonly used.

METRIC NOTATION

In writing quantities of capacity in metric notation there are a few rules that should be followed. A quantity such as 27 litres should be written as 27 l. Note that a space is left between the numeral 27 and the symbol l. This is very important since a lower case el looks like a numeral one. Some early metric guides used a script el, ℓ, but this is discouraged since most typewriters do not have a script el key. When there is a possibility of confusion, the word litre should be written. No period is placed after the symbol unless it is at the end of a sentence.

Numbers that are one thousand or larger use a space instead of a comma to separate groups of three digits. Thus, a quantity such as 27,859 millilitres should be written as 27 859 ml.

When referring to quantities less than one unit in length, a zero (0) is placed to the left of the decimal point. Thus, 0.38 ml would be used rather than .38 ml. This should not be done where there is a combination of whole units and partial units. Write 3.84 kl rather than 03.84 kl.

The last rule is that two different units are never mixed. It is not correct to write or say eight litres four millilitres (8 l 4 ml). Instead this should be expressed entirely in litres, entirely in millilitres, or entirely in some other unit of capacity. Since there are 1 000 ml in one l, there are 8 000 ml in 8 l and so this quantity is 8 004 ml. If this is to be expressed in litres, it is necessary to change 4 ml to 0.004 l for a total of 8.004 l.

These LEVEL I materials make no attempt to teach students how to convert from litres to millilitres or from millilitres to litres. You should not attempt to teach the students these conversions. When their reading and mathematics skills improve to LEVEL II and LEVEL III they will study these conversions. Do not correct a student who writes or says eight litres four millilitres (8 l 4 ml). While this is not technically correct, it does enable the student to communicate with other people.

THE TEACHING SEQUENCE CAN BE. . .

ACTIVITY	MATERIALS NEEDED
Student Workbook, Section D. Audio Tape, Section D.	Audio-cassette tape player.
Learning Activity 1: SPOONS	
Have students find which spoon is the one mentioned in the lesson for measuring red pepper for chili (answer: 1 ml). Which spoon would you use to give medicine to a person who is ill? (Look at the number of millilitre dosages on the bottle, then find the right spoon--5 ml). Ask students why they would need the other spoons in the set. Can they think of any activities besides cooking and giving medication when someone would need to use measuring spoons?	Set of measuring spoons in 1 ml, 2 ml, 5 ml, and 15 ml sizes. Medicine prescription bottles.
Learning Activity 2: LOTS OF LITRES	
Develop a feeling for the size of a litre. Let students handle containers that will hold a litre. Fill them with rice, sand, flour, sugar, water, and so forth. Pour the contents into the litre measuring cup to verify that this is indeed a litre. If possible, bring several products that come in litre containers: colas, uncolas, milk, paint, motor oil, etc., and verify that these are in litre containers.	Containers that hold a litre--one for each student, if possible. Products that come in litre containers. Rice, sand, sugar, water, etc. Litre measuring cup.

STUDENT WORKBOOK PAGES	COMMENT
31-36	Students should listen to the tape while looking at the STUDENT WORKBOOK. As they are instructed on the tape, the students should try to read the sentences with each picture. They should feel free to replay any portion of the tape they did not fully understand. Students are introduced to recognizing and reading the terms millilitre and litre and the symbols ml and l.
	Let the students examine the spoons. How can they tell the number of millilitres each spoon holds? When would they use the spoons? When were the spoons used in the lesson? Have a discussion. See how many different uses they can think of for the millilitre spoons. The spoons will be used later in Learning Activity 7.
	After the students fill their containers have them lift them. How many kilograms are they holding? Guess and check! Do products that come in litre containers really hold a litre? Is the shape of the container deceiving so that some of the products look like they have more than some of the others? Measure and see.

ACTIVITY	MATERIALS NEEDED
Learning Activity 3: GUESSTIMATING LITRES	
Have students guesstimate the number of litres each of the following containers will hold: paper or plastic coffee cup, juice glass, soft drink container (can and/or bottle), casserole dish, frying pan, sauce pan. Use Exercise D.1. Have students write their guesstimates in the space after the question mark. After they have finished guesstimating, ask the students to actually measure the amount each container will hold.	Paper or plastic coffee cup. Juice glass. Soft drink container. Casserole dish. Frying pan. Sauce pan. Litre measuring cup. Water or rice--enough to fill the largest of the above containers.
Learning Activity 4: COFFEE BREAK	
Have the students prepare a pot of coffee for the class using a large coffee pot or percolator. They should put in 2 litres of water and eight 15 ml spoons of coffee. Determine how much sugar and cream each student uses by having him/her use the millilitre spoons.	Large coffee pot or percolator--should hold about 36 cups. Coffee--120 millilitres. Cream or cream substitute. Coffee cups. Water--2 litres.
Learning Activity 5: FILL THE BUCKET	
Have the students fill the large pail or bucket with as many litres of water as it will hold. Mark with a waterproof marking crayon where each litre comes on the pail so that by the time the pail is full you have a large litre measure.	Large pail or bucket. Litre measuring cup. Waterproof marking crayon. Food coloring.

STUDENT WORKBOOK PAGES	COMMENT
37	Students should be starting to have the feel of a litre by now. See how well they can guess the capacity of each of these containers. Encourage guessing. After everyone has guessed, then measure. Praise students that were able to guess within 25% of the correct amount. Turn over the sheet used for Exercise D.1. for more room to guesstimate and measure capacity.
	Let the students make coffee. This will be a good chance for them to use litres and millilitres.
	This is fun but it can be messy. If you think students will have difficulty seeing the water line after each litre is added you might want to put a few drops of food coloring in the first couple of litres.

ACTIVITY	MATERIALS NEEDED
Learning Activity 6: CAN CAN	
Use common can sizes of fruits and vegetables. Have the students find how many millilitres each can contains. Label the size of each can. If 200 ml represents one serving, how many servings does each can contain?	Variety of empty fruit and vegetable cans. Litre measuring cup.
Learning Activity 7: LET'S EAT!	
Have the class prepare the four recipes in Exercises D.2. through D.5.	Measuring and cooking utensils as indicated in the recipes. Enough of each of the food items in the four recipes to serve your class.

STUDENT WORKBOOK PAGES	COMMENT
	You might want to have the students begin this activity by guessing the size of each can. Some cans will have metric units printed on the label so you might want to check before class and remove or cover up any of these units. You might want to cover up or remove any units that are given in the Customary system (such as pounds, ounces, pints, quarts) so that students do not compare the metric units with the customary ones. If a typical serving is 200 ml, how many servings does each container hold? Students might want to weigh the cans to gain more practice in using grams and kilograms.
39-42	This is a tasty activity. Make sure you bring enough food, and any utensils that will be needed such as forks, bowls, salad bowls, mixing spoons, and so forth. Wherever the recipe says or shows "Chop 40 ml carrots" it should be understood that the students are to measure out the 40 ml of carrots after they are chopped. This lesson gives students a chance to use both millilitres and litres.

OBJECTIVE:

For the term degree Celsius, the student will recognize and use the appropriate measurement unit and symbol. Students will select, use, and read the appropriate measuring instrument (clinical or nonclinical Celsius thermometer).

AUDIO TAPE

After completing Section E. the student will be able to. . .

1. Read the words degree Celsius and the symbol °C.
2. Recognize the written words Celsius, hot, cold, Celsius thermometer, and Celsius clinical thermometer.
3. Select a Celsius thermometer as the appropriate measuring instrument when asked to find the temperature of something.

VOCABULARY

Celsius
thermometer (p. 43)*
cold (p. 43)
hot (p. 43)
Celsius (p. 45)
degree Celsius (p. 46)

*STUDENT WORKBOOK page number where word is introduced.

LEARNING ACTIVITIES

1. Estimate the temperature of a room, of the outdoors, or of a container of liquid to within 25% of the actual temperature.
2. Read a Celsius thermometer and a clinical Celsius thermometer correctly.
3. Measure the temperature of the air (in a room or outdoors) and of a liquid in degrees Celsius to within 10% of their actual temperature.
4. Measure the temperature of a person with an oral clinical Celsius thermometer to within 1% of the person's actual temperature.

PARTS:

Part 1. INTRODUCING COLD TEMPERATURE
Introducing the Celsius Thermometer
Part 2. INTRODUCING HOT TEMPERATURE
Part 3. REVIEWING MEASUREMENT OF TEMPERATURE
Introducing the Symbol for Degree Celsius

MATERIALS NEEDED

NOTES

1. Dipping Celsius thermometers (-10°Celsius to 115°Celsius).
2. Clinical Celsius thermometers--five.
3. Celsius demonstration thermometer.*
4. Clinical demonstration Celsius thermometer.*
5. Rubbing alcohol--for sterilizing thermometers.
6. Ice water.
7. Water containers.
8. Ice cubes.
9. Cotton balls.
10. Electric coffee pot.
11. Audio-cassette tape player.

*See Resources and Materials section on pages 58-61.

THE INSTRUCTOR NEEDS TO KNOW. . .

that Section E. is about measuring temperatures. Students will be asked to estimate how hot or cold something is.

The unit most people will use for measuring temperatures is degree Celsius. The tools for measuring temperatures are Celsius thermometers. The symbol for degree Celsius is °C. Usually no space is left between the numeral and the symbol. Thus, 53 degrees Celsius often is written 53°C and not 53 °C. Celsius and C are both capitalized since they are in honor of Anders Celsius, the Swedish astronomer who developed the Celsius scale. The term degree centigrade has been replaced by degree Celsius.

- If you place a Celsius thermometer in ice water the reading should be 0°C; if you place it in boiling water the reading should be 100°C. Normal body temperature is 37°C. A comfortable room temperature is 21°C. Learning Activities 4 and 5 will give you a better feeling for Celsius temperatures. You may want to do these two learning activities before this material is studied in class.

THE TEACHING SEQUENCE CAN BE. . .

ACTIVITY	MATERIALS NEEDED
Student Workbook, Section E. Audio Tape, Section E.	Audio-cassette tape player.
Learning Activity 1: READING DEGREES	
Using a Celsius demonstration thermometer, show the students how to read degrees Celsius. Start with 0°Celsius and point out that water freezes at this temperature. Show 100°C and indicate that water boils at this temperature. Next demonstrate room temperature (about 21°C), and normal body temperature (37°C). Move the indicator to different numbers and ask the students to give you readings until they can do it easily.	Celsius demonstration thermometer.
Learning Activity 2: HOT OR COLD	
Demonstrate different readings and ask students if the reading is hot or cold. For example, 10°C, 30°C, 40°C, -20°C, -5°C.	Celsius demonstration thermometer.

STUDENT WORKBOOK PAGES	COMMENT
43-48	As they have done previously, students should listen to the tape while looking at the STUDENT WORKBOOK. As they are instructed on the tape, the students should try to read the sentences with each picture. They should feel free to replay any portion of the tape they did not fully understand. Students are introduced to recognizing and reading degree Celsius and the symbols C and °C.
	Set the demonstration thermometer at a certain setting and ask the students the temperature indicated. Repeat this with different temperatures as often as it takes for the students to feel comfortable reading the thermometer. Explain the significance of 0°C, 37°C, 100°C. Make sure you use some below zero temperatures.
	Whether something is hot or cold depends on the circumstances. 2°C would be a cold morning but it would be too warm for the freezer compartment of a refrigerator. 40°C would be a very hot summer day, but it would be too cold to cook something in the oven. Establish your frame of reference before you decide whether a temperature is hot or cold. What are good temperatures for cooking? . . . for going to the beach? . . . for freezing ice cream? . . . or having a snowball fight?

ACTIVITY	MATERIALS NEEDED
Learning Activity 3: FEVER	
Demonstrate different readings for body temperature and ask the students to evaluate the readings, and tell you what they would do about them. If they decide to call the doctor, how would they report the temperature? You might want to use 37°C, 38°C, 39°C, 40°C, and so forth and ask whether these are normal or above normal temperatures for infants, older children, or adults.	Celsius demonstration thermometer--if possible, this should be a clinical thermometer.
Learning Activity 4: TAKING TEMPERATURES	
Set up a resource table with four or five thermometers and five or six containers of water ranging from very hot (boiling, if possible) to very cold (use ice cubes or snow, if you can). Have the students take readings and write down their answers. Check their answers and make sure they are writing the responses correctly. Give them enough experiences so that they become familiar with writing answers.	4 or 5 Celsius thermometers. 5 or 6 containers of water at various temperatures. Electric coffee pot. Ice cubes.

STUDENT WORKBOOK PAGES

COMMENT

Try to get a demonstration Celsius clinical thermometer. You may have to make one. Be sure to follow the design of the clinical thermometers you will be using in later Learning Activities. Spend a lot of time showing how to read degrees in tenths and then give the students practice in reading and writing degrees.

Have several thermometers that can be dipped in the containers. Attempt to have the containers at different temperatures. Use insulated containers, if possible, to help maintain the temperature. Fill one container with ice and some water; another with boiling water (you could use a coffee pot to boil water), and so forth. For all containers except the very hot ones have the students first feel the water with their fingers and guesstimate the temperature, then have them take the temperature. Ask them to read the temperature from the thermometer and then write the temperature.

ACTIVITY	MATERIALS NEEDED
Learning Activity 5: AROUND AND ABOUT	
a) Have students measure and record the temperature indoors, at the window, in the center of the room, near the floor, near the ceiling. Are the readings different? Can students explain the differences?	Several Celsius thermometers.
b) If possible have the students measure and record the temperature outdoors in the sun and in the shade. They might also want to compare the temperature in the sun right next to the building, in the middle of the parking lot, or on the lawn. Check the temperature of the shade next to the building or under a tree. If it is early afternoon, check the shade on the east side of the building and on the north side of the building. Are the readings different? Can the students explain the differences?	
Learning Activity 6: BODY TEMP	
Demonstrate how to take one's body temperature orally using the clinical thermometer. Have students practice taking and reading their own temperatures.	Several Celsius clinical thermometers--one for each student, if possible. Bottle of rubbing alcohol. Cotton balls?

STUDENT WORKBOOK PAGES	COMMENT
	As the students move around the room have them try to feel if the temperature has gone up or down. Ask them to guesstimate the temperature in each of the places around the room. Is it warmer near the ceiling? Is it warmer or cooler near the windows? Do they think their answers would be the same during another season of the year?
	Again have the students try to guesstimate the temperature of each of the places outside. Is it really cooler in the shade? What difference does it make if they are near the building? If it is a sunny day they might want to check the temperature in a closed car.
	This will take some time. A clinical thermometer can be difficult to read. Make sure you use the alcohol and cotton and sterilize each of the thermometers after each person has used it. After the students take someone's temperature, ask them to write it down. Then ask them to verbally tell you the temperature. Does their written answer agree with their oral answer and do they both agree with the thermometer?

THE TEACHING SEQUENCE CAN BE...

ACTIVITY	MATERIALS NEEDED
Student Workbook, Section F. Audio Tape, Section F.	Audio-cassette tape player.

Part 1. REVIEWING LINEAR, WEIGHT, CAPACITY, AND TEMPERATURE MEASURES

Part 2. REVIEWING LITRE, MILLILITRE, AND CELSIUS THERMOMETER

Exercise F.1.

Part 3. MATCHING MEASUREMENT TOOLS TO MEASUREMENT WORDS

Exercise F.2.

STUDENT WORKBOOK PAGES	COMMENT
47-48	Students should listen to the tape while looking at the STUDENT WORKBOOK. As they are instructed on the tape, the students should try to read the sentences with each picture. They should feel free to replay any portion of the tape. Students are given a review of the seven terms and seven symbols that were introduced in Section A., Section B., Section D., and Section E.
	These last parts of Section F. give students an opportunity to practice what they have learned in the previous sections. After Exercises F.2. through F.8., the tape player should be stopped so that students have enough time to complete each Exercise. After the students have completed each Exercise the tape player should be restarted. When the player is restarted the students will hear the answer to the Exercise they just completed, and then they will hear the next Exercise. This gives students a chance to realize just how much they have learned. These exercises are for diagnostic purposes only. Since they are self-correcting, students should be able to use them as guidelines to their progress. Neither instructors nor students should be alarmed if students miss an occasional question. Review procedures are suggested below for students who miss two or more questions on any one Exercise.
49	The set of questions in Exercise F.1. is to give students an opportunity to assess how well they can select the appropriate capacity and temperature measurement. Students who do not do well should consider reviewing either Section D. or Section E.
50	The questions in Exercise F.2. give students an opportunity to determine how well they can select the appropriate measurement unit for an object and then recognize the measurement term for that unit. If students do not do well in this part but they did well in Exercise F.1., the instructor needs to help strengthen their vocabulary. If students do not do well in both Exercise F.1. and F.2. they should consider reviewing Sections D. and E.

ACTIVITY	MATERIALS NEEDED
Part 4. MATCHING MEASUREMENT WORDS AND SYMBOLS Exercise F.3.	
Part 5. MATCHING MEASUREMENT TOOLS AND TASKS Exercise F.4.	
Part 6. MATCHING MEASUREMENT TOOLS AND TASKS Exercise F.5.	
Part 7. MATCHING MEASUREMENT WORDS AND TASKS Exercise F.6.	
Part 8. MATCHING MEASUREMENT WORDS AND SYMBOLS Exercise F.7.	
Part 9. SELECTING AND USING MEASUREMENT TOOLS Exercise F.8.	Objects to measure length, weight, capacity. Cool and hot water in containers to measure temperature.

STUDENT WORKBOOK PAGES	COMMENT
51	In Exercise F.3. the students are to match measurement terms with the symbols for these terms. This Exercise will provide students with a measure of how well they can recognize these words and symbols. Students who do not do well should review the vocabulary words and symbols for Sections D. and E.
52	The set of questions in Exercise F.4. is designed to provide students with an opportunity to find out how well they can select the appropriate length, capacity, weight, and temperature measurement. Students who do not do well on this Exercise should consider reviewing the appropriate STUDENT WORKBOOK Section.
53	The set of questions in Exercise F.5. is designed to give students another chance to find out how well they can select appropriate length, capacity, weight, and temperature measurements. Students who consistently miss the same units in Exercise F.4. and Exercise F.5. should go back and review the appropriate STUDENT WORKBOOK Section.
54	In Exercise F.6. students are to select the appropriate measurement unit for a pictured object and then match the picture with the measurement term for that unit. If students do well in Exercises F.4. and F.5. but do not do well in this Exercise then they need help in recognizing the written form for a particular measurement unit.
55	Exercise F.7. asks students to match measurement terms with the symbols for these terms. This Exercise provides students with a measure of how well they are able to recognize these words and their symbols. Students who do not do well should review the vocabulary words and symbols for Sections A., B., D., and E.
	After the tape is completed, place some objects on the activity table for the students to measure length, weight, and capacity. If possible, place some cool or hot water in containers so they can measure the temperature. The previous Exercises checked to see if students know the correct instrument to use and the correct symbol to use when writing the answer. This Exercise checks to see if the students can use the instruments for measuring length, weight, capacity, and temperature.

RESOURCES AND MATERIALS

1. Make-a-Metre Packs: A roll of metre strips of heavy paper in variety of colors. Roll is $3.50 for 100 strips. Pads of decimetre strips and centimetre strips which may be cut apart and pasted or stapled to make a calibrated metre stick. Pads are approximately 70¢ and contain enough for 30 students.

   Available: Metric Supply International
   1906 Main Street
   Cedar Falls, IA 50613

   Improvised Material: Light weight cardboard or nonwoven fabric such as pellon cut into metre size strips. Draw in decimetre divisions with ballpoint pen.

2. Butterick Publishing Wall Chart: "Figure It In Metrics" an excellent chart for developing an understanding of metric clothing sizes. Cost for wall chart measuring 85 x 55 cm and showing 12 figure types is approximately $2.00.

   Available: Butterick Publishing Co.
   P. O. Box 1945
   Altoona, PA 16603

3. Balance Scale: Gram size available in a range of prices. Least costly is Ohaus, Model 1200 School Balance Scale. Cost approximately $17.50.

   Available: Ohaus Scale Corp.
   29 Hanover Road
   Florham Park, NJ 07932

   Improvised Material: A kitchen scale may be recalibrated to measure metrically. An improvised balance scale can be constructed as follows--

   Materials--a metre stick (thin wood), fish line or strong string, small plastic containers like butter containers, and large paper clip.

   Holes can be made in the metre stick with a drill or small screwdriver. The holes at end should be near the bottom. Use large paper clips, which are bent open, to provide hooks from which plastic containers may be hung. A loop of string in the center may be used to suspend the balance scale. Bring scale into balance by adding clay or plastic to the containers.

   To make weights, a square sugar cube is 1 gram, a rectangular one is 5 grams. Use clay balls or water to "make" weights needed.

4. Celsius Demonstration Thermometer: Can be purchased for approximately $6.75 from Ohaus (Ohaus Part No. 80570) or Dick Blick (Catalog No. 88283).

Available: Ohaus Scale Corp.
29 Hanover Road
Florham Park, NJ 07932

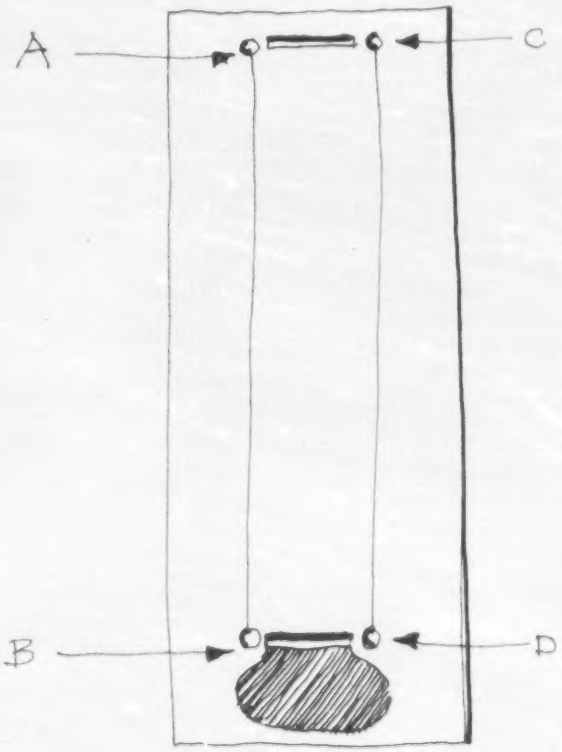
Dick Blick
Box 1267
Galesburg, IL 61401

Improvised Material: An improvised Celsius demonstration thermometer can be constructed as follows:

Materials--one sheet of white poster board 75 cm x 100 cm, a piece of red ribbon and a piece of white ribbon each measuring 2 cm x 95 cm, glue, black felt tip marker, red felt tip marker, knife or razor blade, metre stick, pencil.

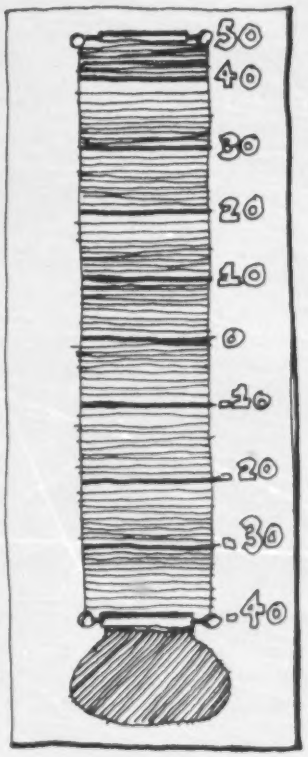
Cut the sheet of poster board in half so that each half measures about 37.5 cm x 100 cm. About 5 cm from the middle of the top of the board cut a slot about 2.5 cm x 0.2 cm. Cut another slot this same size about 5 cm from the middle of the bottom. Your board should now look something like the Drawing 1 here.

With the red felt tip marker draw and color in a circle below the bottom slot. With a pencil lightly mark point A about 1 cm to the left of the top slot, Point B 1 cm to the left of the bottom slot, point C 1 cm to the right of the top slot, and point D 1 cm to the right of the bottom slot. Draw a line from A to B and a line from C to D (see Drawing 1).



Drawing 1

Using your metre stick, mark each of these two lines off in centimetres. Connect the marks that are opposite each other. Your poster board should now look like Drawing 2. Label the bottom mark -40. Count up 10 marks and label this mark -30. Continue counting 10 marks and labeling: -20, -10, 0, 10, 20, 30, 40, and 50. Glue one end of the red ribbon to one end of the white ribbon. You now have one ribbon--red on one end and white on the other. After the glue has dried, insert the ribbon into one of the slots, pull one end of the ribbon through and insert the end into the other slot. Join and glue the two ends of the ribbon. Hold the poster board upright and arrange the ribbon so that the red part of the ribbon comes through the bottom slot. You now have a demonstration Celsius thermometer. By sliding the ribbon up and down you can get different temperature settings.



Drawing 2.

5. Clinical Celsius Demonstration Thermometer: This is an improvised thermometer. The materials and the directions will be the same as for the Celsius Demonstration Thermometer as described in the previous part, #4. If you made that thermometer, then use the other half of the poster board for this thermometer. If not, then you will need a piece of poster board 37.5 cm x 100 cm. Cut the slots 10 cm from the top and bottom instead of the 5 cm that was used in #4. The bottom reading on the thermometer should be 34. Count up ten spaces and label this line 35. Keep counting ten lines and labeling 36, 37, 38, 39, 40, 41, and 42. Insert the ribbon and use, as in the other demonstration. Remember, however, that on this thermometer each mark indicates 0.1°C (one-tenth of a degree Celsius).

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SCRIPT

STUDENT POSTTEST BOOKLET

for

METRICS FOR GOOD MEASURE

LEVEL I

LEVEL I POSTTEST

PAUSE

Open the test booklet to page 1.

PAUSE

There are four rows of pictures on this page. Each row has three pictures. Look at Row A. It has pictures of an automobile, a paper clip, and an ice cube. Which would you measure with a metre stick? Circle the correct picture.

PAUSE

Did you circle the picture of the automobile? You would measure an automobile with a metre stick. Both a paper clip and an ice cube are too small to measure with a metre stick.

PAUSE

Look at Row B. It has pictures of a hammer, a person in bed, and a telephone. Which of these would you measure with a Celsius thermometer? Circle the correct picture in Row B.

PAUSE

You would measure a person's temperature with a Celsius thermometer so you should have circled the picture of the person in bed. Neither a hammer nor a telephone is measured with a Celsius thermometer.

PAUSE

Look at Rows 1 through 10. For each row I will mention a metric measurement term. Circle the picture of the object you would measure using that term. I will not give the answers for the rest of these rows.

PAUSE

Row 1 has pictures of a woman, a pencil, and a fried egg. Which of these would you measure with a kilogram scale? Circle the correct picture.

PAUSE

Row 2 has pictures of a window, a brick, and a can of gasoline. Which would you measure in litres? Circle the correct picture.

PAUSE

Turn to page 2.

PAUSE

Row 3 has pictures of a book, a screwdriver, and a bottle of vanilla. Which would you measure in millilitres? Circle the correct picture.

PAUSE

Row 4 has pictures of a toothbrush, a truck, and a water fountain. Which of these would you measure in centimetres? Circle the correct picture.

PAUSE

Row 5 has pictures of a television set, a piece of Swiss cheese, and a mattress. Which of these would you measure with a gram scale? Circle the correct picture.

PAUSE

Row 6 has pictures of a cold day, a chair, and an automobile tire. One of the items would be measured with a Celsius thermometer. Circle the correct picture.

PAUSE

Turn to page 3.

PAUSE

Row 7 has pictures of a carton of milk, a boy, and a picture frame. Which would you measure in litres? Circle the correct picture.

PAUSE

Row 8 has pictures of a hot cup of coffee, a lollipop, and a sofa. Which would you measure with a metre stick? Circle the correct picture.

PAUSE

Row 9 has pictures of a pair of sunglasses, a sack of potatoes, and a letter. Which of these objects would you measure with a kilogram scale? Circle the correct picture.

PAUSE

Row 10 has pictures of an elephant, a nail, and a school building. Which would you measure with a centimetre ruler? Circle the correct picture.

PAUSE

Turn to page 4.

PAUSE

There are eight pictures on page 4. Beside each picture is a letter or a number. C is a picture of salt being poured from a box; D is a picture of a bowl of hot soup; 11 is a picture of a large dog; 12 is a picture of a fire; 13 is a glass of orange juice; 14 is a pair of scissors, 15 shows several pieces of candy, and 16 is a picture of a book.

PAUSE

In the center of the page are five measurement words--millilitre, kilogram, degree Celsius, centimetre, and gram.

PAUSE

Draw a line from Picture C, the salt being poured from a box, to the measurement word which tells how it can best be measured. Which measurement word would you use to put the right amount of salt in a recipe?

PAUSE

Did you draw a line to the word "millilitre"? You should have, because you would measure the amount of salt in millilitres.

PAUSE

Now draw a line from Picture D, the bowl of hot soup. to the measurement word which tells how hot the soup is.

PAUSE

You should have drawn a line from Picture D to the third measurement term on the page--degree Celsius.

PAUSE

For the rest of the pictures on this page you should draw a line from the picture to a measurement word. I will not give you the answers to the rest of these.

PAUSE

Look at picture 11. This is a picture of a large dog. Draw a line from the picture of the large dog to the word that tells how heavy the dog is.

PAUSE

12 is a picture of a fire. We want to know how hot the fire is. Draw a line from Picture 12 to the measurement word which best tells how hot the fire is.

PAUSE

Picture 13 is a glass of orange juice. If we wanted to know how much juice is in that glass, which measurement term would we use? Draw a line from Picture 13 to the correct term.

PAUSE

A pair of scissors is shown in Picture 14. Which measurement term would be used to tell how long these scissors are? Draw a line from the picture of the scissors to the correct measurement word.

PAUSE

Several pieces of candy are shown in Picture 15. If we wanted to tell how heavy these pieces of candy are what measurement term would we use? Draw a line from Picture 15 to the correct measurement term.

PAUSE

The last picture of the page is Picture 16--a book. Which measurement term would you use to tell how long the book is? Draw a line from Picture 16 to the correct word.

PAUSE

Turn to page 5.

PAUSE

There are six pictures on Page 5. Beside each picture is a number. Picture 17 is a small package, Picture 18 a bicycle, Picture 19 a can of paint, Picture 20 is a doorway, Picture 21 a bathtub full of water, and Picture 22 shows several thumbtacks.

PAUSE

In the center of the page are four measurement terms--metre, litre, gram, and degree Celsius.

PAUSE

Picture 17 is of a small package. If we wanted to know how much this package weighed which measurement term would we use? Draw a line from Picture 17 to the measurement term which best tells how much the package weighs.

PAUSE

In Picture 18 there is a bicycle. If you wanted to tell someone how long the bicycle is which measurement term would you use? Draw a line from Picture 18 to the correct term.

PAUSE

A can of paint is shown in Picture 19. Which measurement term would be used to tell how much paint is in the can? Draw a line from the picture of the can of paint to the correct measurement word.

PAUSE

Picture 20 is of a doorway. You want to know how high this doorway is. What measurement term would you use? Draw a line from Picture 20 to the measurement term you picked.

PAUSE

A bathtub full of water is shown in Picture 21. If you want to know how warm the water is which measurement term would you use? Draw a line from Picture 21 to the correct term.

PAUSE

Picture 22 shows several thumbtacks. You want to know how heavy all of these thumbtacks are. Which measurement term would you use? Draw a line from Picture 22 to the term you picked.

PAUSE

Turn to page 6.

PAUSE

On the left side of page 6 are six measurement terms. Each term has a letter or number. Term E is gram; term 23, metre; term 24 is millilitre; term 25 is degree Celsius; term 26 centimetre; and term 27 is kilogram.

PAUSE

On the right side of the page are seven symbols for the measurement terms.

PAUSE

Look at the measurement term called E. Draw a line from this measurement term--gram--to the symbol for the measurement term.

PAUSE

You should have drawn a line from gram to the symbol g.

PAUSE

Now draw a line from each of the other measurement terms to the symbol that is used to represent that term.

PAUSE

Close the booklet. Thank you very much for your help. Please hand your booklet to the instructor.